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C L A I M S

1. A method of manufacturing tyres for vehicle wheels, comprising the steps of:

- 5 - disposing a carcass structure (3) comprising at least one carcass ply (10) on a primary drum (13);
- assembling a belt structure (4) comprising at least one belt layer (12a, 12b) on an auxiliary drum (14);
- picking up the belt structure (4) from the auxiliary
10 drum (14);
- transferring the belt structure (4) to a coaxially centred position relative to the carcass structure (3);
- shaping the carcass structure (3) into a toroidal configuration to engage the belt structure (4) with the
15 carcass structure (3);

wherein during said step of assembling said belt structure (4), at least one underbelt insert (11) is associated with said at least one belt layer (12a, 12b), at a radially internal position.

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2. A method as claimed in claim 1, wherein association of said at least one underbelt insert (11) with the belt structure (4) comprises the steps of:

- applying said at least one underbelt insert (11) onto
25 an expandable support (18);
- radially expanding the expandable support (18) to mutually join the belt structure (4) to said at least one underbelt insert (11).

- 30 3. A method as claimed in claim 2, wherein application of said at least one underbelt insert (11) is carried out through spiralling of at least one elongated element of elastomer material on the expandable support (18).

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4. A method as claimed in claim 2, wherein concurrently with the radial-expansion step, an angular rotation is imposed to said at least one underbelt insert (11).

5 5. A method as claimed in claim 4, wherein each underbelt insert (11) is such oriented that the axially internal portion (11a) of said insert is substantially parallel to an inner surface of the belt structure (4).

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6. A method as claimed in claim 2, wherein the step of assembling the belt structure (4) on the auxiliary drum (14) is carried out after said radial-expansion step and simultaneously with the mutual-union step,
15 through winding of said at least one belt layer (12a, 12b) around the expandable support (18) carrying said at least one underbelt insert (11).

7. A method as claimed in claim 2, wherein before the
20 radial-expansion step, the belt structure (4) picked up from the auxiliary drum (14) is placed at a coaxially centred position relative to the expandable support (18).

25 8. A method as claimed in claim 7, wherein said junction step takes place through approaching between said at least one underbelt insert (11) and the belt structure (4) by effect of the radial-expansion step of the expandable support (18).

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9. A method as claimed in claim 2, wherein before said transferring step and after said associating step, a step of pressing the belt structure (4) against said at least one underbelt insert (11) carried by the
35 expandable support (18) is carried out.

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10. A method as claimed in claim 1, further comprising the step of applying a tread band (5) around the belt structure (4) disposed on the auxiliary drum (14).

5 11. A method as claimed in claim 10, wherein said tread band (5) is applied through spiralling of at least one elongated element of elastomer material.

10 12. A method as claimed in claim 1, further comprising the step of applying a tread band (5) at a radially external position to the belt structure that is assembled to a tyre under working shaped into a toroidal conformation, through spiralling of at least one elongated element of elastomer material.

15 13. A method as claimed in claim 10, wherein before transfer of the belt structure (4), the step of bending the side edges (5a) of the tread band (5) against axially external portions of said at least one
20 underbelt insert (11) coupled with the belt structure (4) is carried out.

14. A method as claimed in claim 1, wherein the step of laying the carcass ply (10) is carried out through an
25 operation involving winding of the ply around the primary drum (13).

15. An apparatus for manufacturing tyres for vehicle wheels comprising:

- 30 - a primary drum (13) set to support a carcass structure (3) comprising at least one carcass ply (10);
- an auxiliary drum (14) having an abutment surface (14a) set to support a belt structure (4);
- a transfer member (15) movable between the primary
35 drum (13) and auxiliary drum (14);

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- gripping devices (16) associated with the transfer member (15) to pick up the belt structure (4) from the auxiliary drum (14);
- devices (17) for application of at least one underbelt insert (11) to said belt structure (4) when the latter is at a position axially spaced apart from the carcass structure (3).

16. An apparatus as claimed in claim 15, wherein said application devices (17) comprise:

- an expandable support (18);
- devices for winding of the underbelt inserts (11) on the expandable support (18);
- actuator members to radially expand the expandable support (18) between a first operating condition at which said support has a reduced diameter and a second operating condition at which it has an increased diameter.

17. An apparatus as claimed in claim 16, wherein said winding devices comprise at least one unit to feed an elongated element of elastomer material for application of said underbelt inserts (11) through spiralling of said elongated element.

18. An apparatus as claimed in claim 16, wherein said expandable support (18) comprises an inflatable bladder (19), said actuator members being set to feed a fluid under pressure into the inflatable bladder (19).

19. An apparatus as claimed in claim 18, wherein said inflatable bladder (19) has opposite end flaps in engagement with respective axially-opposite attachment flanges (20).

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20. An apparatus as claimed in claim 15, wherein the expandable support (18) comprises a drum having circumferentially distributed apertures, through which radially movable sectors operate upon command of the actuator members.

21. An apparatus as claimed in claim 15, wherein said expandable support (18) is laterally spaced apart from the auxiliary drum (14).

22. An apparatus as claimed in claim 15, wherein said expandable support (18) defines the abutment surface (14a) of the auxiliary drum (14).

23. An apparatus as claimed in claim 15, further comprising pressing members (21) operating on the expandable support (18) to cause pressing of the belt structure (4) against said at least one underbelt insert (11).

24. An apparatus as claimed in claim 15, further comprising devices for application of a tread band (5) to the belt structure (4), at a radially external position.

25. An apparatus as claimed in claim 24, wherein said devices for application of the tread band (5) operate on the auxiliary drum (14).

26. An apparatus as claimed in claim 25, wherein said devices comprise a feeding unit to supply an elongated element of elastomer material for application of said tread band (5) through spiralling of said elongated element.

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27. An apparatus as claimed in claim 24, wherein said devices for application of the tread band (5) operate on the primary drum (13).

5 28. An apparatus as claimed in claim 27, wherein said devices comprise a feeding unit to supply an elongated element of elastomer material for application of said tread band (5) through spiralling of said elongated element.

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29. An apparatus as claimed in claim 24, further comprising bending devices operating on the expandable support (18) to bend end flaps of the tread band (5) against axially external portions (11b) of said at
15 least one underbelt insert (11) associated with the belt structure (4).